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EMERGENCY ENTOMOLOGICAL SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE.

Reporting cooperation between Federal, State, and Station

Entomologists and other Agencies.

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CONTENTS.

REPORT OF THE FEDERAL HORTICULTURAL BOARD.

The Pink Bollworm Situation,-New Outbreaks in Texas. Two additional outbreaks of the pink bollworm were reported to this Department early in November. One of these was near Beaumont in the neighborhood of one of the mills which had received cotton seed from Mexico in 1916. Fortunately the infested field was a small one and was the only cotton within several miles of the mill.But two or three infested bolls were found and a clean-up of this field has been made in the same thorough-going manner as in the case of the infestation found earlier in the season at Hearne, Texas. Two additional fields, one nine miles west of Beaumont and the other about fifteen miles south, were also found to be infested, the infestation evidently coming from the use of seed obtained at the Beaumont mill for planting. These fields have also been made subject to the same clean-up operations. The other infestation surrounds more or less intermittently Trinity Bay, Texas, north of Galveston. The insect was first found at Anahuac on the eastern shore of the Bay, where the infestation extends fifteen or twenty miles along the Bay and to a depth of four or five miles, involving perhaps altogether four or five hundred acres of cotton. This acreage is fairly evenly and rather heavily infested indicating an establishment of long standing, perhaps two or three years. Later, additional infested fields were found to the north and west of the Bay, the total infested area involved being upwards of 5,000 acres. The source of this infestation has not been definitely determined. There is no record of any movement of Mexican cotton seed to this immediate region for planting, and no cotton mill in Texas which received seed from Mexico is directly involved. Two possible theories to account for this infestation have been advanced: (1) That some planter several years ago introduced Egyptian seed into the district, possibly even before the quarantine against foreign seed went into effect in 1913; and

(2) that some ship load or schooner load of cotton seed from Tampico, Mexico, en route to Galveston may have been wrecked at the mouth of the Bay in the great storm of 1915 and the seed washed up on the shores of the Bay. It is known that as a result of this great storm quantities of cotton seed were so washed up on the shores of the Bay, and in some instances carried many miles inland by the high water; the supposition being that this seed came from wrecked stores or vessels at the Port of Galveston.

At any rate the infestation is this regi on is of the most serious character. Fortunately this district is a rather isolated one, surrounded for the most part at least by wide stretches of country unsuited to agriculture or at least where no cotton is grown. Large forces of experts and laborers have been assembled here and the clean-up operations are being pushed with the utmost speed.

The Mexican Situation. Mr. Busck has returned from several months in Mexico. The important results of his trip are (1) the issuance of a quarantine by the Mexican authorities against the Laguna prohibiting the transport of cotton seed from that district; (2) the forbidding by President Carranza of the growth of cotton in the Laguna for three years beginning with 1919 (This order has the recommendation and promise of hearty cooperation of the principal planters of the Laguna district), (3) arrangements for the safe disposition and future control of a small infested region at Allende, Mexico, and (4) preliminary arrangements for the establishment of a research station to study the pink bollworm in the Laguna district. A good deal of survey work was also done by Mr. Busck both as to the Laguna, the Monterrey district, and the cotton growing portion of Mexico contiguous to the United States. So far the only known infestation in Mexico is the Laguna district, the possible remaining infestation of some old abandoned fields near Monterey, and the Allende district some thirty miles south of Eagle Pass. The work done in Mexico by Mr. Busck was materially aided by the hearty cooperation of Mr. Eduardo G. Tejada, a very intelligent and public-spirited citizen of Mexico, who is being considered as a possible aid in the future work in Mexico, more particularly in relation to the research station.

C. L. Marlatt,
November 27,1917.

REPORTS OF SECTIONS OF THE BUREAU OF ENTOMOLOGY.

Cereal and Forage Crop Insect Investigations.

As the season of field activities for 1917 nears its end the outlook as regards the chief insect pests of cereal and forage crops in general is encouraging. With the exception of white grubs and grasshoppers, none of the more dangerous enemies seems to be present in sufficient numbers to warrant apprehension. Of course, this does not mean that a great outbreak of chinch bug, Hessian fly, army worm, or green bug

can not occur during the growing season of 1918. Nevertheless, field conditions at present indicate no such probability.

The Hessian fly throughout the Mississippi Basin is present in moderate numbers, especially in parts of Missouri, Kansas, and Nebraska. Reports from the states west of the Mississippi River indicate that many of the "flaxseeds" which should have produced adults of the autumn generation did not emerge and are still alive in the old stubble. The results of this phenomenon remain to be determined. Excessively dry conditions prevail in Southern Kansas and Northern Oklahoma, so that wheat has made but little growth. In some places it is not even above ground. Where wheat was sown on stubble after simply disking, quite severe local infestations are present, thus demonstrating the folly of such practices and emphasizing the necessity of plowing down stubble after each harvest. In the Eastern States, the fly, while present, is but scatteringly so and no immediate dnager is apprehended.

Chinch bugs are present in moderate numbers throughout Southern and Central Kansas and Missouri. They are abundant in some parts of Oklahoma and Texas and if the weather conditions in the spring of 1918 should prove especially favorable for their multiplication an outbreak of bugs is quite possible.

Judging from the flight of May beetles in 1917 and the reports of field entomologists received during the present fall, white grubs doubtless will be numerous and injurious in Northeastern Iowa, especially in Clayton county. Southern Wisconsin, Michigan, and Northern Ohio probably also will suffer during the growing season of 1918. Next summer will be the second one in the life cycle of the young of 1917 and as this is known to be their most injurious stage, damage to corn in the regions mentioned is especially to be expected. Grub injury is also present in Southern Kansas and Northern Oklahoma and these injuries may be expected to continue during the coming season. The injuries are due mainly to the grubs of *Lachnosterna lanceolata* a species which is confined almost exclusively to the drier Western and Southwestern States, such as Nebraska, Kansas, Oklahoma, Northern Texas, and eastern Colorado and New Mexico. A brief publication treating on the control of this species is in course of preparation.

The grasshopper outlook in the West and Northwest is somewhat alarming. Conditions in North and South Dakota are especially threatening. It is known that vast numbers of eggs were deposited during the present fall and that unless extremely unfavorable weather conditions should develop during the winter and spring a serious outbreak is almost inevitable. Plans are being made to meet the situation by employing entomological extension workers who will undertake, through the States Relations Service, to demonstrate the control of the pest by the most approved methods. Trouble from grasshoppers is almost sure to occur also in California, Western Montana, and parts of Missouri, Colorado, and Ohio.

The note furnished by Professor Swenk of Nebraska regarding the

use of alfalfa meal in the preparation of grasshppper baits, which was published on page 14 of Emergency Circular No.7, has elicited the following comments from Messrs. V.L.Wildermuth and T.D. Urbahns:

Mr. Wildermuth's comment is as follows: "At the current market prices as quoted at Tempe, Arizona, it seems there would not be much saving. These prices are as follows: Bran, $1.75 for a 65lb.sack; Cattle molasses, $.70 per gallon; lemons, $.40 per dozen; Paris green, $.80 per lb.; alfalfa meal, $1.75 per cwt. Figuring the cost of a twenty-five pound bran mixture and a fifteen-pound alfalfa meal mixture we have the following:

Bran - 25 lbs.	$.67	Alfalfa meal-15 lbs.	$.26
Molasses-2qts.	.35	Molasses-1 gal.	.70
Lemons-½ doz.	.20	Lemons-½doz.	.20
Paris green 1 lb.	.80	Paris green-1 lb.	.80.
	$2.02		$1.96

It may be seen from this that the cost would be approximately the same if we follow Professor Swenk's suggestions. We note, however, that Professor Swenk advises using only three lemons with fifteen pounds of alfalfa meal. This could be done in the bran mixture and possibly decrease the efficiency not more than five to ten per cent, as we have always found that a decrease of lemons meant a decrease in the efficiency of the treatment. Professor Swenk also does not say how much ground the alfalfa meal mixture would cover. I seriously doubt, even although the alfalfa meal would swell to the same bulk as twenty-five pounds of bran that one would be able to cover an equal amount of ground in putting out the treatment, and, consequently, the saving as noted would not be great. We shall, however, be glad to try his formula. At this laboratory we have in use the following formula: Bran, 32½ lbs.; molasses, 2 qts.; lemons, 6; Paris green,1 lb. Our reasons for adopting this formula is that bran is always purchased, in this section of the country, in sixty-five pound sacks, and this amount of bran is used because by dividing a sack in half saves time in mixing, and we do not need to weigh our material."

Mr. Urbahns submits the following statement: "Since Professor Swenk requests to learn the results secured by others in the use of this mixture I might say that we used alfalfa meal to replace bran in large quantities during 1915-1916 in the central valleys of California. This was mostly in alfalfa fields where grasshoppers were present in great abundance and destroying the fields of green alfalfa. We used:

Alfalfa meal	25 lbs.
Paris green or arsenate of lead (powdered)	1 lb.
Black-strp molasses	2 qts.
Lemons	6
Water	about 6 gal.

The amount of water varied greatly and depends upon the fineness or coarseness of the alfalfa meal; fine alfalfa meal requiring considerable more water than the coarsely ground product. As a substitute for bran, alfalfa

meal has given very satisfactory results; in fact, in one locality nothing but alfalfa meal was advocated, and it did not occur to the farmers to use anything else. In this locality they successfully controlled and almost eradicated the grasshoppers as a pest before the end of the second season. The two objectionable features of the use of alfalfa meal are: (1) It is usually so fine that there is a great waste when the bait is spread broadcast with an end gate grain seeder; and (2) if the bait is prepared with alfalfa meal it must almost be spread immediately because it will sour before the following day in very hot weather."

We shall be glad to receive any available information from our men regarding this subject. A reduction in the cost of grasshopper bait is, of course, a most desirable thing, and it would seem advisable for investigators who can to experiment with sawdust as a substitute for either alfalfa meal or bran wherever this substance may be easily obtained during the coming summer. According to Mr. Davis' experience, it seems to be fairly effective when used as a substitute for bran in the baits for cutworms.

Mr. T. D. Urbahns, located at Martinez, California, reports rather severe and general injuries from wireworms during the past summer throughout the coast region of California and has taken up the problem with a view to securing information which will result in the reduction of these injuries.

W. R. Walton,
November 27,1917.

Truck Crop Insect Investigations.

In the November number a partial resumé of the injury during the year was furnished. Some interesting data in regard to truck crop pests have been reported since that time.

Ants were reported from Newark, N.J., as injurious to tomatoes by tunneling through the stalks and killing quite a good many of them. A letter of instructions for the treatment of these ants was received just in time to save remaining plants and our correspondent secured healthy plants from sickly ones.

During November Mr. Roy E. Campbell reported that the bean aphis (Aphis rumicis L.) which has been quite troublesome in California for about a year was observed in Orange county, on broad beans sown as a cover crop.

The cabbage aphis (Aphis brassicae L.) was reported injurious to cabbage at Frankfort, N.Y., and was found in the greatest abundance on the outskirts of the District of Columbia, completely covering the foliage of Savoy cabbage, which is evidently more subject to injury than other crucifers. The affected plants were badly stunted and, of course, ruined for food. Insects were able to survive in perfect condition on the cabbage a week after it had been cut for market the last of the month.

Cutworms were reported from various states but naturally were not so destructive as in the spring. They were quite numerous in the vicinity of Wichita, Kansas, where they were reported by Mr. F.M.Wadley. This species was observed at lights in that locality, as also in the District of Columbia, up to the middle of the month. Considerable injury by cutworms was also reported late in November in Los Angeles county, California, Our attention has been called to cutworm injury being particularly severe to various truck crops in portions of Washington State during the year.

The false chinch bug (Nysius ericae Schill.) which has been the subject of study on the part of various agents in Colorado and Kansas, could not be located, with the exception of one adult which was observed at Rocky Ford, Colorado, November 3.

The striped cucumber beetle (Diabrotica vittata Fab.) which has been under constant observation in order to discover its hibernating quarters, began to disappear from Maryland westward to Iowa during early November, and was less seldom seen after the middle of that month. On warm days beetles were observed clustered on squash, pumpkin, and similar fruits left in the field. This species was still in evidence in the field at Muscatine,Iowa, according to C.E.Smith, until nearly the end of November.

The bean ladybird (Epilachna corrupta Muls.) was observed at Alpine, Texas.

In Orange county, California, Mr.Roy E.Campbell, reported the beet army worm (Laphygma exigua Hbn.) as causing considerable damage to the pea crop; indeed it defoliated pea vines to such an extent as to cause new shoots to start from the base of the stem. In some instances which came under observation 25 per cent of the vines were infested. Growers are familiar with this pest from its attack in other years when its presence was not so serious as during the past season.

The potato aphis (Macrosiphum solanifolii Ashm.) was reported as quite destructive to potato in the vicinity of Trenton,N.J. where attack began when the potato began to bloom, about July 4. This aphis rapidly destroyed the vines and the growth of the tubers stopped. Few of them reached anything like full growth and the total from several acres in one case was about what our correspondent had expected from a single acre. Investigation showed that nearly every potato patch in that vicinity was attacked and ruined in the same manner.

The spinach aphis (Myzus persicae Sulz.) was reported as injurious to celery in different portions of New Jersey and to turnips in Missouri. It is still present on cabbage, collards, Brussels sprouts, and crucifers growing in the District of Columbia.

The Southern green plantbug (Nezara viridula L.) was reported as a pest in Texas. Early in the season many complaints were made of this speciesmin Louisiana where it has been given special study by Mr.T.H. Jones. Taking everything into consideration even with its limited distribution this species is without doubt one of the prominent pests of the year. It affects practically all truck crops grown in the Gulf region and undoubtedly has caused injury in other states in addition to those which have been reported.

The garden myripod (Parajulis hortensis L.) was reported destructive to onion, carrot, and celery in Illinois, and to potato in New Jersey.

Root-maggots (Pegomya spp.) continue to be the subject of special correspondence especially where their injury occurs in the State of Washington. Nevada is also much troubled with this class of pests.

The potato tuber moth (Phthorimaea operculella Zell.) was reported injurious to potatoes at Long Beach, California.

Present Distribution of the Sweet Potato Weevil. The sweet potato weevil (Cylas formicarius Fab.) continues as the most important pest of the year because of its menace to the entire sweet potato crop of the Gulf States and those which border the northern border lines of these States. Extension Entomologist, E.P.Barrios, has been particularly active in work on this species where it occurs in Southern Louisiana. In a way the insect may be said to have "peacefully slept" in the southern parishes but the interest which has been taken in this insect of late is arousing growers to the danger of losing their entire crops.

Up to the present date we had not known of the positive occurrence of the sweet potato weevil (Cylas formicarius Fab.) in any other States than Florida, Louisiana, and Texas, but it had been surmised that with the knowledge that the species was permanently established in Duval and Baker counties in Florida, it would be only a matter of time when it would cross the St.Mary's River into Georgia. This had not been verified until November 19, 1917, when Prof. Wilmon Newell wrote that he had received information from the County Demonstration Agent of Charlton County in Georgia that the sweet potato weevil occurred three or four miles from St.Mary's River in the southern portion of that county, and that there was a heavy infestation, the insect doing a great deal of damage, each year gaining in headway and destructiveness. He stated that tubers placed in banks for storage in the fall were permanently destroyed during the winter months. This is evidence that the insect has been in that region two or more years before the time of our receipt of this information.

From Florida to Louisiana there is a stretch of land which had not been reported as having harbored this weevil extending from Baker county in the former state to St.Tammany and St.Bernard parishes in the latter, a distance of about 575 miles.

These last two localities border the State line separating Louisiana from Mississippi. We have further to report that Mr. K.L. Cockerham, of the Extension Service, Bureau of Entomology, has located this species during the month at Gainesville and at Lake Shore in Hancock county, Miss. The species has crossed the Pearl River and the county of Mississippi bearing the same name is in danger. Lake Shore, Miss. is on the Gulf of Mexico, and we can now expect that the species will be found along the Gulf and it may be present in Mobile county in Alabama.

In Texas the sweet potato weevil ranges from Brownsville and Pharr in Cameron and Hidalgo Counties, respectively, on the Mexican boundary, westward to Callahan county and northward to Fannin, Red River, and Bowie counties, which border the Red River. From these three counties, however, the species can be carried across the river to Bryan, Choctaw, and McCurtain counties in Oklahoma, while Mill and Lake counties in Arkansas are also threatened. It must be added that

the species is also present in three other localities, Greenwood, Blanchard, and Shreveport, in Louisiana, which border Arkansas. These three regions were probably infested from eastern Texas.

To summarize, the species has been known long as an inhabitant of Florida, Louisiana and Texas, but it has been only recently learned that Georgia has been invaded through northern Florida; Mississippi has become infested from Louisiana; and from the town known as Lake Shore on the Gulf Coast, it is very safe to infer that if Alabama has not already been entered from the West it is only a matter of a short time before it finds its way there. Conceding this, how long will it take for this species to enter Oklahoma from Texas, Arkansas from both Texas and Louisiana; and for it to travel along the coast line to southern South Carolina? Some localities, indeed, may be inhabited now in the States mentioned through independent introductions.

F.H. Chittenden,
November 24,1917.

Southern Field Crop Insect Investigations.

Cotton Boll Weevil. The boll weevil line in Oklahoma has been completely worked out by Mr. Tucker and runs through Frederick in Tillman County, Mountain View in Kiowa County, Watonga in Blaine County, Hennessey in Kingfisher County, thence dips southward to Guthrie in Logan County, Weleetka in Okfuskee County, and Muskogee in Muskogee County. Otherwise the boll weevil line is as announced in circulars 7 and 8.

Mr. E.A. McGregor has reported the occurrence of the weevil on Thurberia at Nogales, Arizona, and also found it on cotton at Guayamas and Esperanza in the State of Sonora, Mexico.

The usual map and circular detailing the distribution of the boll weevil will be printed during the present month.

The boll weevil injury to sea island cotton in Florida and Southern Georgia has been very serious.

In view of the extremely early termination of the boll weevil dispersion this year caused by early frosts it would appear that there is an unusually fine chance for winter control of the species. The entomologists throughout the South should advise the planters everywhere to follow out all possible winter methods of control of the weevil, such as the destruction of stalks of corn and cotton, burning of weeds, plowing of fields, and clearing of underbrush. It is of especial importance that all cotton now standing in the fields should be picked as soon as possible and the plants, or at least the bolls remaining on the plants, destroyed.

W.D. Pierce,
November 27, 1917.

Forest Insect Investigations.

Recent reports point to the danger of an outbreak of the Southern Pine Beetle in northern Georgia and South Carolina. The remedy for this insect is to cut and utilize for fuel or lumber and burn the refuse of trees that die during late fall.

A.D.Hopkins,
November 28,1917.

Bee Culture.

The Secretary of Agriculture has recently approved an allotment of $15,000 from the emergency agricultural appropriation for extension work in beekeeping and field men are now being appointed. This work will be confined to those parts of the country where a considerable increase in the honey crop in 1918 may reasonably be expected. On account of the limited funds available it seems best to have each field man cover three or four states and, so far as possible, these will be arranged so that the entire region is one where similar manipulations are desirable.

So far as possible the field men will address meetings of beekeepers only, rather than discuss beekeeping before audiences of general farmers. It is not desired at this time to induce more people to take up beekeeping but rather to make better beekeepers of those now in the business. There are now many thousands of persons in the country who own bees and an increase in this number is not needed. It is believed that the one-subject meeting will give the best results.

The following work has already been begun:

(1) California, Arizona and New Mexico. E.F.Atwater of Meridian, Idaho, will conduct this work. He has for several years managed 1000 colonies in ten apiaries. Most of the work will be done in southern California, where beekeeping is conducted more extensively than elsewhere in the country. In that region both American and European foulbrood exist and the beekeepers have become quite confused on the symptoms and treatment of the two diseases. In all probability this subject will occupy most of Mr. Atwater's attention. The University of California is contemplating the giving of extension courses for beekeepers of one week duration, these to be held in three regions. At these it is proposed to cover the field of practical beekeeping and to utilize the services of practical beekeepers of the state. Mr. Atwater will assist in this work.

(2) Colorado, Wyoming, Utah and southern Idaho. Mr.C.E.Bartholomew, who has been conducting beekeeping extension work in Tennessee, has been transferred to this field. This region produces a white honey from alfalfa and sweet clover and the majority of beekeepers have produced comb-honey. Special emphasis will be placed on the desirability of changing to extracted honey. The wintering problem is of special importance since only a few beekeepers of the region have adequately cared for their bees and as a result they lost much of their early crop from the failure to have colonies of gathering strength.

(3) Illinois, Wisconsin and Minnesota. Mr.G.C.Matthews of

Hansen, Idaho, will cover this field. Mr.Matthews is a native of Illinois but for several years past has managed several commercial apiaries in the west and has had much experience in moving bees in disease control. This region produces white clover honey especially. The prevalence of bee diseases has greatly reduced beekeeping in Illinois and the state probably produces less honey now than formerly. In Wisconsin and Minnesota there are vast unoccupied fields for the development of commercial beekeeping and an effort will be made to induce beekeepers to establish out-apiaries to produce extracted honey and to increase their apiaries.

(4) Michigan, Indiana and Ohio. Mr.P.W.Erbaugh of Michigan will cover this field. Mr. Erbaugh has been instructor in beekeeping in the Agricultural School at Winona, Indiana, deputy apiary inspector in Michigan, and instructor in beekeeping in the Michigan Agricultural College. Each of these states has good apiary inspection service but they have not been sufficient to control the diseases. It is believed that the time has come to emphasize the extension work in disease control instead of inspection with police power. In Michigan there is already some extension work in beekeeping with which the Bureau will cooperate.

(5) Iowa, Missouri, Kansas and Nebraska. Mr.E.W.Atkins will cover this field. He is a graduate of the Ontario Agricultural College, where he specialized in beekeeping with Mr.Morley Pettit. He served as apiary inspector there and was also engaged in commercial beekeeping. Recently he was engaged in beekeeping research work at the Iowa Agricultural Experiment Station. Beekeeping has recently made a rapid advance in Iowa and the effort there will be to expand the apiaries. In Missouri the disease situation is bad and there is no apiary inspector. Kansas and Nebraska are states of great promise in beekeeping but so far the industry is not well developed. Most of Mr. Atkins' time will be spent in Iowa and Missouri.

In addition to these groups of states, two more will be covered as soon as men are appointed. During the winter months it is proposed to employ practical commercial beekeepers to work in the states already included in the above mentioned groups to supplement the work of the men regularly assigned. Probably four or five men will be appointed for this work. The principal work of these temporary men will be to explain to beekeepers the need of a special effort to increase the honey crop immediately.

The extension work in North Carolina which Mr. C.L.Sams is conducting, will continue as usual and Mr. Kenneth Hawkins will continue work in the southern states in cooperation with the Office of Extension Work in the South, States Relations Service.

The wholesale price of honey has advanced in 1917 to figures never before reached and this fact will be of great help in the effort to increase production. This increase is due in a large part to a heavy demand for honey for export to England, France and Italy. The sugar shortage in this country also has been an important factor. Owing to the unorganized condition of the beekeeping industry, many beekeepers were induced to sell their crops at ridiculously low figures, much of it being sold in advance of production and before the price was established. The Bureau of Markest is issuing semimonthly quotations which have proved of great value and that Bureau is also interestingitself in plans for cooperative marketing of honey.

E.F.Phillips,
November 27,1917.

Tropical and Subtropical Fruit Insect Investigations:

Status of Icerya control at New Orleans, La. to date. All things considered the progress of Icerya control at New Orleans during the summer and fall has not been entirely satisfactory. Apparently several agents have retarded the successful propagation of the Vedalia. Chief among them must be mentioned the Argentine ant. This ant undoubtedly aids in a very material increase of the Icerya. In the fall of the year they reach their maximum numbers and these hordes so effectively patrol and guard the scale infestations that the adult ladybeetles are not allowed a moments peace. By means of a natural protection the Vedalia larvae are not molested by the ants, nor are the stationary pupae but the adults seem to lack this protective quality and many of them are actually killed and devoured by the ants.

The extremely high temperatures accompanied by relatively high humidity during the summer exerted a very depressing effect upon the propagation of the Vedalia. They died off in millions and so few of them were to be found on the small Icerya infestations still remaining after the successful spring campaign, that they could not entirely hold the scale in check. For about a month, from mid-September to the middle of October the weather was ideal for their propagation and they did very nicely, then it turned much too cool and for the past six weeks they have done very little outdoors. Just how much retardation is due to the weather and how much to the Argentine ants it is difficult to surmise.

It seems fully safe to predict that with the coming of spring the lady beetles will once more jump into the fray and effectively clean up those small infestations of the Icerya now remaining in New Orleans.

Very interesting results have been obtained through the very effective control of the Argentine ant in and around the hothouse used for the propagation of the Vedalia. Until the ants were controlled no difficulties were encountered in obtaining heavy infestations of the Icerya on three large Pittosporum bushes which were planted in the hothouse and caged for Vedalia propagation. Since the control of the ant, however, the Icerya is not doing nearly so well. The honeydew which was assiduously gathered by the ants for food, now remains attached to the scales and as it continues to be excreted it drops down forming threads which "candy" in the dry atmosphere. So much of this honey-dew is in evidence that the plants have taken on a snowy appearance.

C.L. Marlatt,
November 27,1917.

REPORTS FROM STATE OFFICERS AND OTHER CORRESPONDENTS ARRANGED BY STATES.

ALABAMA.

I am glad to be able to report that rather an extensive inspection for the sweet potato root borer, Cylas formicarius, has failed to reveal any trace of this pest in Alabama. We are trusting that it is not established here, and I believe that there is no appreciable danger at the present time in unrestricted shipments of Alabama-grown sweet potatoes to any other territory.

The boll weevil advance during the middle of October carried that insect to within about fifteen miles of the extreme northeastern corner of this state. Every county in Alabama is now considered infested.

On the satsuma oranges, in the southern part of Alabama, the only insect pest of importance this season has been the soft brown scale, Coccus(Lecanium)hesperidum. It would appear that the unusually cold winter 1916-17 destroyed the parasites of this scale and enabled it to multiply this season much more extensively than it has done heretofore. The citrus white fly, Aleyrodes citri, was practically exterminated in many sections by the defoliation of the citrus trees last winter. We are anticipating the institution of a series of experiments in fumigation for the control of the brown scale and other citrus insects in this state. This work will be started early in December.

During the fall months we conducted an extensive campaign for the control of insects affecting stored corn. With the large crop that has been produced in Alabama this year, there is prospect of these insects destroying something like ten million dollars worth of corn during the storing season. The investigational work which has been done in Alabama on this subject has revealed simple, practicable changes in the time of gathering and methods of storing corn by which more than half of this insect loss could certainly be prevented if these changes would be generally adopted.

W.E.Hinds,
November 26,1917.

FLORIDA.

The principal insect which is receiving the attention of most of the entomological and advisory agencies in the state continues to be the sweet potato root weevil, Cylas formicarius. This insect has been found in the following counties: Baker, Brevard, St.Lucie, Palm Beach, Broward, Dade and Monroe; also on Sanibel Island, Captiva Island and Buck Key in Lee County.

The State Plant Board has adopted a provisional quarantine, prohibiting shipment of sweet potato tubers and plants into Florida. This is covered by rule 32 of the Plant Board, copy of which is enclosed.

Areas infested within the state have been defined by the Plant Board in public notices, and shipments of sweet potatoes out of these

areas to other sections not infested are prohibited, unless the same are fumigated with carbon bisulphide under the supervision of an agent of the Plant Board. To induce growers to fumigate their own supplies and to become familiar with the process, Mr. K.E.Bragdon, Agent of the Plant Board, has been visiting several of the infested areas for this purpose. The quarantine on tubers is covered by rule 34.

Shipment of sweet potato plants from infested areas is entirely prohibited. This prohibition is covered by quarantine promulgated in rule 33, herewith enclosed. This quarantine also includes morning-glory tubers, roots, vines and parts thereof.

The Extension Division and Bureau of Entomology are cooperating with the State Plant Board in this campaign against the sweet potato root weevil in bringing known methods of control to farmers in infested districts.

Weevils infesting stored grains and other seeds, as usual, are causing considerable injury.

The cotton stainer, Dysdercus suturellus, has been received from South Florida as doing considerable damage to cotton there. It should be added here that growing cotton in south Florida, at least in an extensive way, has only recently been undertaken, since the cotton boll weevil is infesting the cotton growing counties of the northern part of the state.

The lace bug, (Corythuca gossypii) has several times been received on castor bean leaves from the southern part of the state, where extensive plantings of this bean are being made.

Rust mites and red spider of citrus continue to be reported as injurious and advice for treatment requested.

The common white fly and the cloudy-winged white fly are reported as unusually severe, especially in those parts of the state where the trees were only partly defoliated, or where other host plants of the common white fly were not injured by the freeze of last February. In such localities these flies were not much noticeable during the early part of the summer and growers gave them but little attention, believing that they would not get severe this year. It was early surmised, however, by entomologists here, and so advised in press notices, that the white fly would in all probability quite recover its normal severity by the end of the season, and the growers were furthermore advised to introduce the fungus parasites of these white flies early, while the season for fungus was at its best, namely, during the period of summer rains. Many growers, however, did not heed these warnings, with the result that they failed to get the benefit of these fungi.

E.W.Berger,
November 28,1917.

The negro bug is injuring chufas to a large extent. It sucks the tubers until they are dry and pithy and almost valueless as a feed for hogs. There seems to be two species involved, one is the Corimelaena pulicaria. This is the more common of the species in this part of the State at least.

In the southern part of the State we have complaints of Pangaeus bilineatus.

The slug which was reported in the last issue as injuring tomatoes at Dania has been identified as Vaginulus floridanus. Epicaerus formidolosus seems to have been more abundant than usual this year. It was common on corn and cowpeas andhas been sent in scores of times from cotton where it was mistaken for the cotton boll weevil. During the past month it has been sent in from Jensen where it was reported as injuring beans. It eats the leaves as of all other plants it attacks.

The cabbage lopper has been as abundant as usual at this time of year. The flea beetles, bean jassid (Empoasca mali) and aphids have been reported as injuring crops in many parts of the State. The bean leaf roller Eudamus proteus has been about as abundant as usual, and the pumpkin bug Nezara viridula has been troublesome on cowpeas and citrus. Perhaps not quite as troublesome as last year at this time.

J.R.Watson,
November 21,1917.

Idaho.

The returns now coming in from the seed houses here, who report an annual trade of about 100 cars of 40,000 lbs. each of clover seed, (chiefly red and alsike) as the output of this tract, go to show that there is exceptionally little clover seed made sticky by honey-dew, of Aphis bakeri, but that on the other hand there has been a large loss from either Bruchophagus funebris How. or other causes of seed failure. At first I thought this due to the scarcity of bees this spring, but yesterday saw a field where the hay growth had been rank but the seed yield hardly 4 bu.per acre (7 to 8 bu. had been grown on the same land), and no sign of clover root borer or seed chalcid. So far this year I can find no evidence of the dying clover crowns and roots, so common last,year, especially after the seed crop had been cut in fields heavily infested with Aphis bakeri, crowns which invariably yielded swarms of Rhizoglyphus rhizophagus mites and in two cases new species of gnat to be described by Prof.Johannsen in the genus Sciara. This field, without such evidence of insect damage or of other pathological signs, was flanked on opposite sides by two large apiaries and had had, according to the owner, numbers of Bombus in the second bloom period. His thresherman had said to him that he was not surprised at the scant seed yield, since the field was streaming with spider webs of a blackish brown field spider, and that all such fields lacked in yield. I find these spiders still thick in this and other fields and have supposed them predaceous and wonder if that is the sign of some other insect, their prey, numerous enough to injure clover seed yield. False chinch bugs and Lygus pratensis or variety are the only other numerous insects present since the heavy frosts.

In a neighboring red clover field, grasshoppers were bad enough, Dissosteira carolina L. and Melanoplus bivittatus, to half kill out the

crop before the owner came to the successful rescue, though late, with poison bran mash.

In this tract of 4000 feet altitude, there has been no clover aphis discoverable till about August 15, all this country was salted down with winged Aphis bakeri . As previously reported, they became common on fruit trees, especially Anjou pear, Quince, and Hungarian prune, less so on Seckel pear and Rome beauty apple, where eggs were laid in numbers during October. The last mating pairs blew down with the yellow leaves of Anjou pear in the wind of November 12, often 20 to 80 pairs per leaf, where on the ground they continued to mate and lay. One farmer reported not cutting his red clover till the end of October with the result that he had the only sticky seed (and only slightly sticky at that) near town, due to the sudden increase of Aphis bakeri on clover since the first frosts. These frosts account for the disappearance of all parasites and most ladybirds, as Aphelinus lapisligni How. and Hippodamia convergens Guer. With ice forming on the irrigation ditches on many mornings but with hot noonday sun, these aphids have multiplied in some tufts of new red clover leaves (tufts as big as two fists) to 3000 to 6000 individuals all over petioles and leaf surfaces and continue to produce large numbers of winged migrants. Out of sixty trees of many varieties at this substation, only about six retain leaves partly green in the upper half of the crowns, while most orchards not irrigated as late as mine are leafless. Where do these migrants go? Former Entomologist, Parks found this species to lay eggs at this time of year in the Boise Valley (2600 feet altitude) abundantly on red clover crowns, but I find none I am disappointed to say, nor any form likely to lay eggs as yet so far as clover is concerned. This is all the clew I have as to how Aphis bakeri epidemics are started in some red clover fields at least two weeks before the spring migrants can get over from the apple trees. Alsike clover tufts have as many as a dozen apterous viviparous females, each solitary in basal peticle bracts, save for 1-3 young with them. These alsike fields had none the first of August, so far as my search could find although similar fields had this aphis in June the year before.

I am not adept at insect prophecy in a land new to me, but with a mild winter I predict that grasshoppers and clover aphis will sweep this tract next year worse than it did last year, which was the worst in the fourteen year history of this season, and lost over $3,000,000 on this tract alone, I roughly reckon.

Aphis pomi and Aphis sorbi are still rarely found in numbers on single trees, laying eggs in abundance. A dormant bud spray of nicotine and some sulphur compound just as the buds swell is the most noticeably lacking and the most necessary step in the tree practice of this region.

It is rumored that the European leaf beetle has become established in Northern Idaho. A most remarkable abundance of Aphis bakeri is growing in clover fields.

A.C. Burrill,
November 24,1917.

MINNESOTA.

State Entomologists have frequently to deal with matters other than those relating to insects. The Minnesota Entomologist with the approval of the Director of the Experiment Station and with the co-operation of the United States Bureau of Fisheries, is again arranging to furnish live fish to stock ponds on Minnesota farms, which are suitable for maintaining fish life.

F.L. Washburn,
November 22, 1917.

MISSISSIPPI.

The most notable occurrence along entomological lines during the past month in this State was the discovery of *Cylas formicarius* at Gainesville, Lakeshore, and Ansley, Hancock County, Mississippi. Although there previously had been rumors of the occurrence of this weevil in the State none of the insects had actually been taken until November 7, 1917, when K.L.Cockerham of the Bureau of Entomology found infested sweet potatoes at Lakeshore and the next day at Gainesville. On November 23 they were found at Ansley. These insects have been present apparently for at least two years at all three of these places. A systematic effort is being made to find other portions of the State that may be infested with this weevil. The three infested farms are in the southern part of Hancock County, which is the southernmost county of Mississippi, bounded by Louisiana on the west and the Gulf of Mexico on the south.

During the past month the cottony cushion scale, *Icerya purchasi* has been found on seven properties at Ocean Springs, Jackson County, Mississippi. This is the largest number of infested properties known in any county in the State. In Harrison County four properties at Pass Christian are known to be infested. In Hancock County the scale has been known to be on one property for more than a year but has been kept in control. Besides being in the three coast counties, *Icerya purchasi* also has been present on two properties at least 100 miles from the coast at Brookhaven in Lincoln County. Here the scale has not increased seriously because of the continuous fight made against it by the property owners. This makes a total of fifteen properties in Mississippi that are known to be infested by *Icerya purchasi*.

For the past four or five years, during November and December, *Diabrotica 12-punctata* has caused considerable loss by eating into ripe Satsuma oranges in the Gulf Coast region of Mississippi. The adult beetles eat into the oranges, sometimes several holes will be made in one orange. The number of beetles found eating in a hole varies from one to nine. The loss varies considerably with different groves, in some cases these beetles destroy more than 10 per cent of the oranges. G.F.Arnold of this department observed the work of

these beetles frequently during November and December 1916 and believes that the loss could be greatly reduced if the owners would hasten the picking of the fruit and not allow it to remain on the trees too long.

R.W.Harned,
November 24,1917.

MISSOURI.

Our men in cooperation with Mr.Kelly of your Bureau have completed the collection of wheat samples from the outlying experimental fields and we are pleased to find that except for an occasional sample showing the presence of partly developed larvae, only one field coming under their observation has shown any real Hessian fly infestation. This field is near the entomological station at Charleston, Missouri. They report wheat looking very promising though a little short in all parts of the state covered by them in the survey just completed.

Extension Entomologist Fort of your Bureau is now devoting his efforts to the grasshopper and chinch bug problems throughout central Missouri. His meetings are being well attended showing a growing interest on the part of farmers in cooperation for the protection of next year's crop from insect scourges. The grasshopper and the chinch bug are likely to be two of the foremost pests of the cereal and forage crops in our state next year, but with favorable conditions and thorough cooperation on the part of the farmers we need have comparatively little anxiety from these sources.

Extension Entomologist Hamilton with the Deciduous Fruit Insect Division of the Bureau has just entered upon his duties and will devote his efforts between now and Christmas primarily to the control of San Jose scale. In the San Jose scale we have a very important orchard problem but fortunately our fruit growers are learning to control the pest and in all real up-to-date orchards it is no longer a serious pest.

L. Haseman,
November 26, 1917.

NEBRASKA.

Beginning November 1, the office of the Nebraska State Entomologist inaugurated an entomological survey of the winter wheat growing district of southeastern Nebraska, primarily to determine the situation as related to the principal insect pests of wheat as it exists this year. Several counties have now been surveyed, wholly or in part, with very gratifying results. The method employed is to collect at least three samples from typical fields in each township of the county being surveyed. These are sacked in the field and later examined carefully in the laboratory. The fact has been brought out that in none of the several counties examined is the new wheat seriously

infested with Hessian fly. The amount of general infestation varying fromone-thirtysecond of one per cent to one-ninth of one per cent in different counties. Here and there individual fields with about one per cent infestation are to be found. The volunteer wheat, where it has not been eliminated by the extended winter killing of the wheat crop of 1917, is more heavily infested, from two to eight per cent of the plants containing "flaxseeds" of the Hessian fly.

Hibernating chinch bugs have been found in but a few localities in anything but very small numbers, but in a few places there seems to be enough of them to make possible more or less injury in case of a dry spring and summer in 1918.

Wheat aphids are being found rather plentifully in the new wheat, occurring in from thirty to forty percent of the fields examined.

The English grain aphis (Macrosiphum granaria) seems to be the commonest species in most of the counties, but in others the oat aphis predominates and it is always a close second.

Wheat root lice belonging to the species Forda occidentalis and Geoica squamosa are also generally distributed, and in a few fields are quite numerous.

Everywhere large numbers of thrips have been found hibernating in the new wheat.

The wheat stem maggot seems to be exceedingly scarce in the new wheat crop, only a very few having been found.

Cutworms of various species occur in about normal numbers. In general, it seems evident that no threatened serious insect injury exists in the surveyed counties of southeastern Nebraska, as far as can be determined at this time. The general condition of the wheat is fair to good and the acreage is large.

Myron H. Swenk,
November 24,1917.

NEW YORK.

There is a considerable prevalence of the white marked tussock moth in cities throughout the State. The New York State Forestry Association has become interested in the control of insects and is planning to offer prizes to school children in ten districts for the purpose of materially bettering conditions another year. There have been previously, local campaigns for the collection of the eggs of this pest though this appears to be the first state-wide effort to secure a general control and the outcome will be watched with considerable interest.

E.P.Felt,
November 26,1917.

NORTH CAROLINA.

At this season complaints are usually few, but there have been been even less than normal during the period under review. Weevils of grain, beans and stored grain products seem to attract chief notice. Will welcome some Bureau publications which shall standardize treatments for these and give basis for extension teaching in the field in lectures and in publications; and we would welcome the services of a competent emergency agent on this subject.

Mr. Jesse M. Robinson, Bureau Emergency Agent, Deciduous Fruit Insects, has completed a month here familiarizing himself with the practices, spraying schedules, etc. in use by the best growers, and with guidance of our own and Bureau publications, urging less proficient fruit-growers to catch step with the better ones in pest control. Mr. H.N.Gellert, Bureau Emergency Agent, Truck Crop Insects, is devoting the month of November to our early truck section where early potatoes, early cabbage, etc. are grown for northern market. He is accumulating a mailing list of potato growers who will be urged to use the poison Bordeaux spray which has given marked results in our tests.

In Beekeeping Extension, C.L.Sams has made a fairly complete survey of beekeeping in Martin County in eastern section. In that county 41 beekeepers have 2,406 colonies, mostly in frame hives. They produced this year over 70,000 pounds (thirty-five tons) of honey, the best being an average of 80 pounds section-honey per colony from 35 colonies. In this county there are 17 members of the State Beekeepers Association, averaging 103 colonies each. This county presumably does not have more nectar than several others but does come nearer to the complete utilization of it, yet it has room for more good beekeepers. This points one way toward the conservation of sugar. Preparations are under way for the second annual meeting of the State Beekeepers Association to be held at New Bern in January, the present prospects for which are excellent. Beekeeping is beginning to assume the proportions of a real business in this state.

Franklin Sherman,
November 20,1917.

OHIO.

We made a crop pest survey just preceding wheat harvest, our surveyors working along four parallel lines from the southern to the northern border of the state, entering 56 out of our 88 counties and exploring a considerable number of wheatfields in each county. All knowledge possible was obtained regarding all crop pests during this survey, including the potato aphid. The results were given publicity through press bulletins, our monthly bulletin, and the Ohio Farmer.

H.A.Gossard,
November 23,1917.

PENNSYLVANIA.

Bud moth, Tmetocera(Spilonota)ocellana, has been observed several times injuring mature apples in a manner which closely resembles the injury resulting from late codling moth work. This injury is quite widespread in the state and in several instances materially reduced the amount of fruit which could be classed as number one fruit.

Palmer worm (Ypsolophus pometellus) has caused quite a little damage to mature fruit, especially where the fruit is graded and sorted carefully; fruit injured in this way, while perfectly sound must be sorted as seconds.

Codling moth, (Carpocapsa pomonella) has caused serious injury in a large commercial orchard by burrowing into the wood, especially where the bark shows the presence of any bark canker or roughening due to any other cause.

Peach tree borer (Sanninoidea exitiosa) has been reported and observed in peach orchards in many parts of the state. These insects seem to be especially prevalent this fall, even in orchards which are regularly wormed spring and fall.

C.H.Hadley,Jr.,
November 26,1917.

Very rigid inspection of our larger nurseries is being carried on this autumn to insure clean stock for fall shipment. The more important nurseries have been inspected from two or four times during the past summer, with great care, and the clean up before autumn shipment will be very thorough, although handicapped somewhat by the shortage of labor.

J.G.Sanders,
November 20,1917.

PORTO RICO.

The changa, Scapteriscus vicinus is very much in evidence this month. The adults are flying in great abundance to the lights at night and many reports have been received of their injury to the tobacco seed beds. The adults of the common white grub have almost disappeared from the field for the year, the Dynastid beetles, Dyscinetus barbatus and D. trachypygus however are still very abundant.

The Mirid bugs Dicyphus luridus and D. prasinus are beginning to appear upon the young tobacco, but at present are not causing much damage.

Considerable damage is being done by the larvae of the Noctuid moth Xylomeges sunia which feeds on a large variety of truck crops.

R.T.Cotton,
November 14, 1917.

TENNESSEE.

Cicadula 6-n ɸtata. In several of the wheat fields in the southwestern part of the State, this jassid has appeared in large numbers. Many of the farmers have taken it to be the true Hessian fly, and attempts were made to plow under wheat. One County Agent made hasty steps to disseminate the information that this was not the Hessian fly and the wheat should not be turned under. The grain was not seriously affected although the effect of this jassid attack is appreciable.

Cylas formicarius. This beetle has been found in several parts of the state doing serious damage to the sweet potatoes. At present my records show the beetle to be present at Gleason, Weakley County; Humboldt, Gibson County, Springfield, Robertson County; Knoxville, Knox County, and from infested potatoes on exhibition at a Fair at Erwin, Unicoi County, we may infer that the weevil also occurs in Unicoi County.

Aphis forbesi and Macrosiphum fragariae. Of the approximately 200 strawberry plant inspections which have been made during the late summer and fall months in the different parts of the state, fully 75 per cent of the fields have been infested with the above named aphids, varying from 5 to 85 per cent.

Schizoneura lanigera. In the apple nurseries of the state when trees have attained the age of two years, from 20 to 40 per cent of them have roots highly infested with this root louse, the result being that fewer apple trees are being grown in the nurseries than heretofore.

Bruchus obtectus. More complaints are coming into the office from injury to beans from this insect than ever before. A press letter has been written on the subject of treating beans and seeds, and distributed generally throughout the state. The press has also called attention to this important matter.

Scolytus rugulosus. This insect has drawn the attention of the fruit growers to its attacks, now that the pruning season is on, more than in any previous year. We frequently find sources of contamination in dead or partly dead trees, dead limbs and prunings, the beetles multiplying in numbers and attacking young, vigorous growths.

Chrysobothris femorata. We have only one record of serious injury resulting from attack of the round-headed apple tree borer, but we have numerous complaints from the flat-headed apple tree borer. Each year the complaints received from the injury of this beetle are increasing. During the past month numerous complaints have been received.

G.M. Bentley,
November 26, 1917.

VIRGINIA.

Arrangements are gradually being perfected for the extension work in entomology under the food production act. The work with truck insects has been definitely arranged and the proposed work with fruit insects has been discussed with leading orchardists. It is understood that Mr.Gillert has been assigned to the truck region in Virginia and North Carolina to work with insects attacking truck crops. As the season in North Carolina is several weeks earlier than in Virginia, it has been proposed that the extension entomologist begin his work with certain insects in North Carolina and as the season advances, take up the same problems in Virginia. Mr. Gillert will spend the months of November, January, March, May and July in Virginia. This it is believed, will enable him to cover the most important problems with which truckers have to deal.

It has been proposed that while in Virginia the entomologist be located at Norfolk and confine his efforts mainly to the tide water region or that portion of the state east of Richmond. The problems undertaken will naturally depend to some extent upon the insect outbreaks which occur during the growing season, but the plan at present is to give attention to insects that attack potatoes, peas, cabbage and melons.

W.J.Schoene,
November 24,1917.

WEST VIRGINIA.

In the inspection of orchards for Peach Yellows in the eastern part of the state during the summer and fall, I was struck with the scarcity of the San Jose scale in this section. At no time since the introduction of this pest into the state has the scale been so scarce in the commercial orchards of this section. I am unable to account for this condition of affairs, unless it is due to continued spraying and the work of predaceous and parasitic insects, and perhaps climatic conditions.

During the summer the bag worm, Thyridopteryx ephemeraeformis, has been unusually abundant in many sections of the state, as we have received more specimens of this insect for identification than in previous years.

W.E.Rumsey,
November 22,1917.